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# **The Energy Outlook and Its Implications for the USSR and Eastern Europe**

**An Intelligence Assessment**

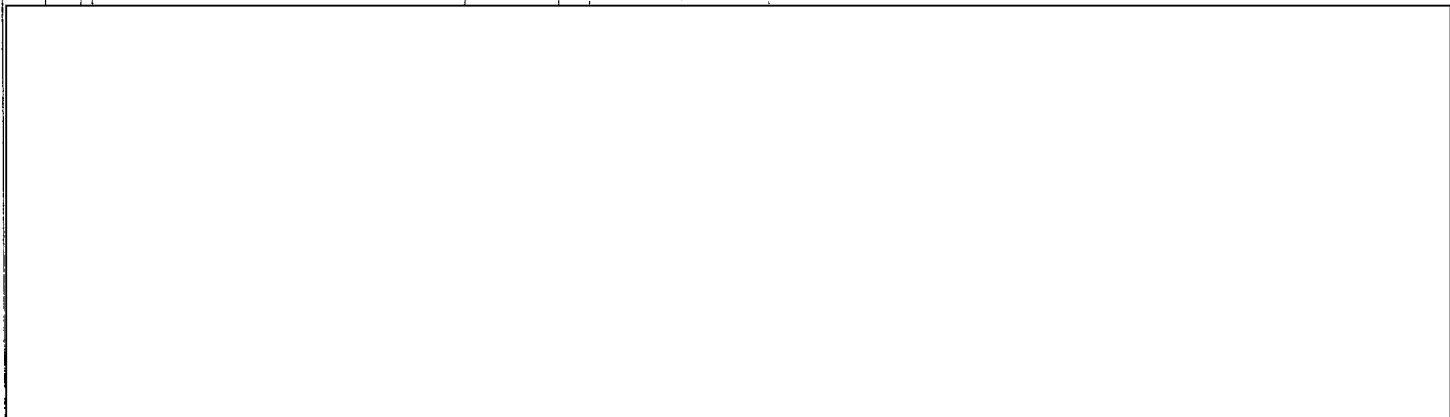
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ER 80-10102  
February 1980

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# The Energy Outlook and Its Implications for the USSR and Eastern Europe ( )

An Intelligence Assessment

*Research for this report was completed  
on 8 February 1980.*

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ER 80-10102  
February 1980

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## **The Energy Outlook and Its Implications for the USSR and Eastern Europe**

### **Overview**

Constraints in energy supply threaten to push economic growth in the USSR and Eastern Europe to very low levels in the 1980s.

As a result, annual increments to national output in the 1980s may be too small to permit the increases in investment and consumer goods and services needed to sustain reasonable economic growth and maintain an acceptable level of consumption. If the flow of resources allocated to investment cannot be stemmed without causing future output increments to fall and if defense allocations remain inviolate, consumer welfare and living standards will be severely reduced—with all the political hazards that this would entail.

A prospective decline in Soviet oil production is only part of the problem. Coal output is stagnant, and the rapid growth of natural gas production cannot bail the USSR out, because gas-oil substitution possibilities will remain severely limited through much of the 1980s. Meanwhile, energy savings through conservation have been and will continue to be limited.

Because Eastern Europe depends so heavily on Soviet energy supplies and cannot afford to buy much oil elsewhere, falling Soviet oil production in the early 1980s will curtail Eastern Europe's economic growth as well.

Soviet leaders remain optimistic about the USSR's energy prospects over the very long run, based on coal and nuclear power. They are, however, very aware of the potentially severe oil crunch in the 1980s and its implications both for their own economy and that of Eastern Europe. Moscow realizes that it must somehow ensure the flow of enough energy or face a nearly stagnant economy and political unrest.

The outlook for obtaining the needed amount of energy in the right mix, however, is dismal. The spiraling price of oil, coupled with slower growth of Western markets, will limit Soviet and East European ability in the mid-1980s to pay for the imports of oil required just to sustain even the current consumption levels. Thus, the Soviet and East European leaders realize that they must intensify their efforts to obtain oil at concessionary prices from the oil-producing developing countries—through arms sales, barter deals, and development assistance. The prospects for concessionary deals, however, with OPEC countries—except in the case of Libya—appear increasingly poor. Eastern Europe is strapped for hard currency now, severely limiting its purchases. This situation will increasingly apply to the USSR, as it loses its oil export earnings and becomes a net importer of oil for hard currency in the mid-1980s.

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The Soviets may have miscalculated both their own capacity to supply oil to Eastern Europe in 1981-85 and the East Europeans' capacity to (1) acquire oil from OPEC countries, (2) substitute coal for oil, or (3) reduce economic growth and consumption without provoking unrest. The Soviet attitude seems to be that the East Europeans are going to have to pull in their belts just as the Soviets have. Although disturbances in Eastern Europe would be highly undesirable, the USSR may not be prepared to pay *any* price to avoid the use of military force, even against Poland.

Faced with the prospect of a critical Warsaw Pact dependence upon OPEC sources of oil supply, the Soviets could opt for an aggressive policy in the Middle East. They might, in desperation, consider such radical action as a unilateral military seizure of Iran's oilfields. Iran's oil supply, secured more or less intact, would go a long way toward alleviating the economic problems facing the Warsaw Pact nations in the mid-to-late 1980s. The Soviets would have to weigh this benefit against the extraordinarily high risk involved in such a step.

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## The Energy Outlook and Its Implications for the USSR and Eastern Europe

### The USSR

The USSR is the world's leading oil producer, with 11.7 million barrels per day in 1979. Production growth, however, has slowed markedly in recent years; the 1979 increase of about 280,000 was the smallest absolute increase since 1956. The 1980 goal of 12.1 million b/d has been revised downward from the original plan of 12.4-12.8 million b/d, but it is unlikely that even this target will be reached.

Oil production is now declining in all of the major oil-producing regions except West Siberia, and even there gains are uncertain now that the supergiant Samotlor oilfield has reached its peak. Samotlor, which has accounted for the bulk of production growth in recent years, is likely to slump in the next year or so and then fall rapidly. Meanwhile, the decline already underway in older major producing regions probably will accelerate as reserves are depleted.

As a result, chances are good that Soviet oil production will peak this year at less than 12 million b/d before falling. By 1985, Soviet oil output probably will fall to between 8 million and 10 million b/d and is likely to decline still further after 1985. The upper end of the range predicted for 1985 assumes that exploration is relatively successful, development drilling goes well, and the Soviets can acquire the needed equipment and technology, mainly from the West. If things go poorly, output could fall as low as 8 million b/d in 1985.

Beyond 1985, production probably will continue to decline, although at a slower rate. In the long run, the future of Soviet oil production depends on Soviet success in discovering and developing oilfields in new areas—primarily in the Barents and Kara Seas, the deep waters of the Caspian Sea, Eastern Siberia, and the deep onshore Caspian depression—and in exploiting large, known reserves of heavy oil. None of these areas have been explored intensively, and any new finds would have little impact on oil production until the late 1980s or early 1990s. Moreover, the Soviets still must find a way to extract the heavy oil that is not producible by conventional means.

Development of the offshore areas and deep onshore basins will require Western equipment and technology. Even so, much of the technology for exploring and developing resources in the Barents and Kara Seas is not even available in the West, thus complicating and prolonging the ultimate exploitation process.

If the Soviets manage to find and develop large deposits in new areas, the oil production decline could be halted or even temporarily reversed, but probably not before the 1990s. These judgments draw a discouraging picture of Soviet oil prospects. They rest on our analysis of the USSR's reserve situation and drilling requirements.

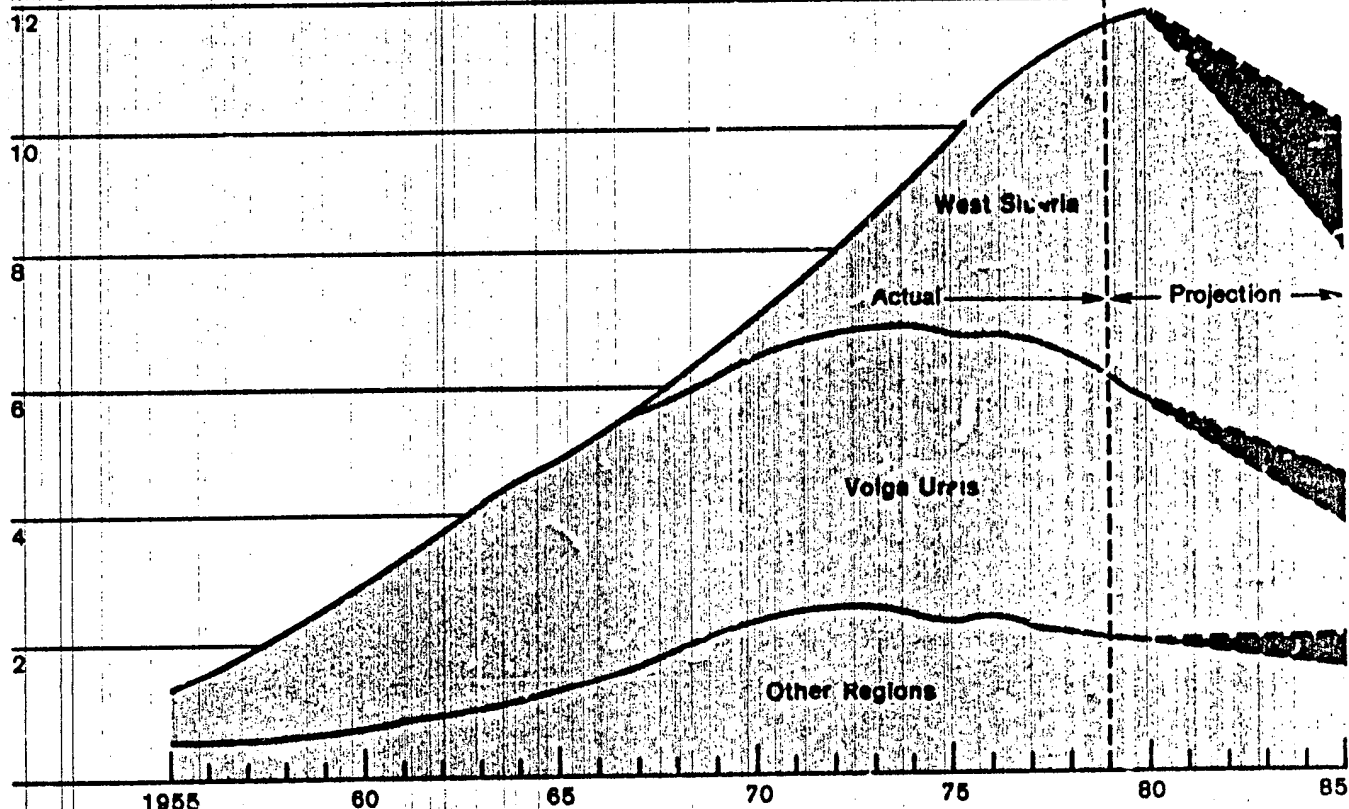
**Inadequate Reserves.** Recent Western estimates, based on the study of oil basins and major oilfields, place Soviet recoverable reserves at about 50 billion barrels, although we believe them to be less—on the order of 30-35 billion barrels. Some of the proven reserves will be difficult to develop, however, since the majority of large fields discovered in recent years have been heavy, even "nonflowing" oil.

Reserves are being depleted rapidly in all major producing regions while the discovery of new reserves is lagging. The Soviets have repeatedly emphasized the need to develop a new oil province comparable to Western Siberia during 1976-80. But no new giant oilfield has been discovered since 1973. Large unexplored areas of the USSR may contain substantial oil and gas, but they are remote and their potential is unknown.

Reserves of conventional oil in areas that are currently producing are inadequate to support the present level of production after 1980. The major structures have already been found, and remaining oil lies in smaller, deeper, highly pressured, and difficult-to-detect structures. The USSR has allowed exploratory drilling, especially wildcatting, to lag. Moreover, given the

## USSR: Oil Production Trends and Projections

Million b/d



existing deficiencies in geophysical and drilling technology, rapid development of new reserves in oil regions will be very difficult.

With the growing role of heavy oil and a need to boost recovery rates in older fields, enhanced recovery techniques become more important. Enhanced recovery methods—mostly thermal—produced an average of only 40,000 b/d during 1976-78, less than 0.4 percent of total production. A 1979 Soviet press report indicated that only 2 percent of the necessary equipment for enhanced recovery was available and existing equipment was not working well. Enhanced recovery methods are not likely to help much in the 1980s because they are expensive, have long leadtimes, and involve substantial imports of Western technology.

**Drilling Requirements.** In trying to avert a drop in oil production, the Soviets have raised drilling targets and have emphasized the development of West Siberian oil—their only hope for stabilizing production in the early 1980s. The increased drilling needs are largely explained by the accelerating depletion of fields in older regions and by the declining productivity of new wells. The drilling goals, which call for the Petroleum Ministry to drill 75 million meters in 1976-80—4 million meters more per year than in 1971-75—appear out of reach; the Soviets have fallen far short of this target thus far. During 1981-85, Soviet oilmen say that drilling will have to be twice the 1976-80 total (about 150 million meters) just to maintain production at the 1980 level.



Almost all of the planned drilling increases are slated for West Siberia, but even there drilling targets are not being met. Part of the problem is that oil production has run ahead of the installation of the infrastructure necessary to support the oil and gas industries. In mid-1978, of the 10 new fields that were developed after January 1976 in the more remote areas, none had roads and only two had electric power connections. West Siberian construction organizations do not have the capacity to handle increasing demands. The inadequate road-building program, for example, seriously endangers the entire drilling plan. Demands on transportation cannot keep pace with West Siberian development. Drilling alone requires 1 ton of freight per meter drilled. Demands on the railroads are especially heavy in the winter months; since few all-weather roads are available, much of the equipment must be delivered to the remote oilfields when the surface is frozen.

In older oil-producing areas such as the Volga-Urals and Azerbaydzhan, considerable effort is required simply to minimize declines in production. Extensive in-fill drilling, construction of oilfield facilities, and use of electric centrifugal submersible pumps will be necessary. Since drillers, equipment, and skilled oil-field workers are being diverted from older regions to work in Western Siberia, production declines in the Volga-Urals and elsewhere could be steeper than the Soviets anticipate.

#### **Fuel Substitution Not the Answer**

Rising production of natural gas and coal, which in any case are not fully substitutable for oil, will only partially offset the decline in oil output.

**Natural Gas.** Although gas reserves are large and yearly output goals were surpassed in 1976-79, a future slowdown is likely. All growth in production must come from the permafrost regions of the northern part of West Siberia. The cost and physical difficulty of developing deposits there and piping the gas thousands of kilometers pose unprecedented problems. Lack of infrastructure, harsh Arctic conditions, and dependence on Western supplies of large-diameter pipe compressors and valves are likely to hinder exploration. Production from the country's other major gasfields in the Ukraine, Northern Caucasus, and Central Asia peaked in 1976 and has begun to decline.

**Coal.** Meanwhile, coal production has been a huge disappointment as targets have been underfulfilled by a wide margin. The Five-Year Plan's original goal for 1980 of 805 million tons is unlikely to be reached, even by 1985. Coal production fell in 1979 and at 719 million tons was a scant 1 percent above the 1976 level. New mine capacity has been slow coming on stream while mine depletion has been rising, especially in older basins in the Western USSR. New coal basins are located in Siberia, far from major consuming centers, and much of the coal is poor-quality—low in heat value, hard to ship, or not adaptable for use in existing Soviet boilers.

**Nuclear Power.** Although Moscow assigns a high priority to nuclear energy, its role in energy output will be minor in the coming decade. Installed nuclear capacity is now about 10,000 megawatts (MW). Output of nuclear-generated electricity was about 50 billion kilowatt-hours in 1979 and accounted for less than 1 percent of primary energy output. Projections, which have been scaled down by the Soviets in recent years, now call for 35,000 to 40,000 MW in capacity by 1985 (less than 4 percent of all energy) and 100,000 MW by 1990. Almost all of this capacity is to be developed in the European USSR.

#### **Leadership Reactions to the Energy Problem**

Soviet leaders have been aware of growing energy problems since at least the early 1970s but did little about them until 1977. Their response was to boost investment in oil and gas and to step up the drive for energy conservation.

**Investment.** In December 1977 Brezhnev established the fuel-energy sector as a "leading link," meaning that the sector had priority for the investment that would achieve "maximum and rapid results." Within this sector, emphasis was placed on hydrocarbon (oil, gas and coal) production and the urgent development of the Tyumen' Oblast in Western Siberia.

The investment originally planned for 1976-80 in primary energy production has been increased on a crash basis. In 1978 the increment in investment in oil, gas, and coal nearly doubled and accounted for almost one-half of the increase in total industrial investment.

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**Conservation.** Brezhnev admitted to the Central Committee Plenum in November 1978 that despite the expenditure of 50 billion rubles on conservation measures, "in practical terms there is no lessening of waste and losses" of fuels.

Practically all of the potential energy saving is concentrated in six sectors<sup>1</sup> representing almost 80 percent of Soviet oil consumption. The savings that conservation efforts can wring out of the economy are limited because the efficiency of heat production, electricity generation, and rail transport using existing capital stock is already high; because the Soviets are slow to convert to more energy-efficient equipment; and because of constraints on the substitution of other fuels.

Conservation in the heat and power sector has been given considerable emphasis, with fuel requirements per unit of electricity output declining 11 percent between 1970 and 1979. Improved efficiency was achieved largely by upgrading generating equipment; almost all obsolete equipment has been replaced. The Soviets are world leaders in cogenerating heat and electricity, with more than 1,000 combined heat and power plants in operation.

As for the transport sector, energy consumption per ton-kilometer and passenger-kilometer is much lower in the USSR than in Western Europe or the United States. The USSR uses only one-fourth as much energy per passenger-kilometer as the United States and only about two-thirds as much per ton-kilometer of freight. Thus, we see little opportunity for additional savings in Soviet transport.

Industrial energy savings will be slow in coming. Steel is the second largest oil-consuming industrial sector, and the Soviets intend to make this their next conservation effort. Nonetheless, the substantial replacement of heavy, oil-consuming machinery in steel and other industries takes time.

Some oil conservation can be achieved by the substitution of other fuels, principally natural gas. A significant proportion of Soviet heat and power plants

<sup>1</sup> Electricity and heat generation, iron and steel production, the residential-communal sector, construction, transport, and agriculture.

already switch from oil to gas on a seasonal basis, and increased gas supplies to this sector would reduce oil consumption. However, 54 percent of Soviet oil is consumed in internal combustion engines, and large-scale conversion can only come very slowly. There are also limitations in the near term in the degree to which coal and nuclear power are practical substitutes for oil in generating heat and power. Major coal mines are distant from consumption centers, and the declining heat value of mined coal (down 10 percent in 10 years) is offsetting the increase in volume. Nuclear power substitution is constrained by long leadtimes in installing capacity.

Real growth in gross national product has been falling in the USSR and is expected to drop further in the 1980s. Meanwhile, energy consumption in the USSR has traditionally risen about as fast as GNP, primarily because of the emphasis given to expanding energy-intensive heavy industry. This has occurred despite (1) the rapid shift in the USSR away from coal and toward the use of oil and gas, which burn more efficiently than coal, and (2) massive investment in cogeneration and the electrification of railways, measures that also improved energy efficiency. In contrast, the energy intensiveness of output in industrial Western economies has declined markedly since 1973. Since the Soviets probably cannot shift industrial priorities sufficiently in the next six years to effect measurable energy savings, we project energy requirements to continue to grow about as fast as GNP during 1981-85.

#### **Energy as a Constraint on Growth**

During the early and mid-1980s energy supplies will be critical for economic growth. During the last two decades, the Soviet energy supply base expanded much faster than the growth in internal demand. As a consequence, the USSR is now a major energy exporter with present net energy exports of about 4 million b/d oil equivalent. Oil accounts for three-fourths of this figure. Shifts now underway in the underlying supply situation—especially the expected drop in oil production—will cause a fundamental change in this relationship. If oil production falls to 9 million b/d by 1985, the growth of total energy production will slow greatly, from an average of about 1 million b/d oil equivalent per year (or 4 percent)

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during 1976-80 to an average of only 200,000 b/d oil equivalent per year during 1981-85 (less than 1 percent per year).

On the basis of our growth projections for the labor force and capital stock in the USSR in 1981-85, we think GNP could grow by about 3 percent per year, *if there were no energy constraint*. But GNP growth at this rate would also require an increase in domestic energy consumption of 3 percent per year. In addition, other Communist countries now receive about 2.5 million b/d of Soviet energy—mainly oil—and will probably have to have at least this much in the 1980s to stave off economic disaster.

To meet both domestic requirements and exports to Eastern Europe, the USSR would have to *import* about 4 million b/d of energy from the West on a net basis by 1985; in 1979, it *exported* 1.3 million b/d of energy for hard currency. Practically all of the energy imported would have to be in the form of oil. Moscow clearly could not afford to buy oil on this scale—about \$40 billion worth of imports in 1985 at the oil prices prevailing in January 1980. First of all, the shift to a net import position would deprive the USSR of its major source of hard currency. In 1979, the Soviet Union sold about 900,000 b/d of oil to the West for about \$9 billion, about half of its hard currency receipts from merchandise exports. Moreover, even under optimistic assumptions concerning Soviet hard currency export earnings, the oil bill would greatly exceed Soviet import capacity of an estimated \$15 billion in 1985 (1980 prices). Oil imports this large would obviously exhaust Soviet hard currency resources. Increases in oil prices relative to other commodity prices, which are almost certain to occur by 1985, simply would curtail Soviet import capacity even further.

The Soviet energy shortfall would thus have to be absorbed through a combination of slower economic growth and adjustment in fuels trade. The exact mix of adjustments—in the domestic Soviet economy and in trade—is unpredictable. Illustrative projections assuming a reasonable combination of policy shifts in several areas—energy, fuel substitution, manpower, and hard currency trade but maintaining Soviet oil exports to Eastern Europe—show Soviet economic growth falling from around 3 percent in 1981 to little

more than 1 percent by 1985. Included in these estimates is a projected shift in Soviet oil trade with the West—from a current surplus of roughly 900,000 b/d to a deficit in 1985 of about 600,000 b/d (\$6 billion). Substantially higher oil imports would not be affordable if imports of grain and capital goods are to be maintained even at minimal levels. Nonetheless, imports of Western machinery would decline substantially in the face of slowly expanding import capacity and heightened competition from other uses of Soviet hard currency earnings.

The impact of oil shortages on the Soviet domestic economy is not just a matter of reduced economic growth. Soviet leaders are probably well aware that the much smaller increment to national output available annually in the 1980s could not sustain the increases in investment and consumer goods and services that the USSR would need each year to sustain reasonable economic growth and maintain an acceptable level of consumption.

If there is no reduction in the growth of resources allocated to defense and investment—and the latter would have to be maintained to keep future output increments from falling even further—then consumption and thus living standards would fall. Maintaining the same shares of a much smaller GNP pie would not be much better. Consumption would still fall by the mid-1980s. This could have a profound impact on labor productivity while increasing tensions within the Politburo and the population.

#### Eastern Europe

Eastern Europe imports about one fourth of its energy consumption. About three-fourths of the imported energy comes from the USSR—just under 85 percent, if Romania is excluded. The Soviet energy crunch and spiraling OPEC prices have forced Eastern Europe to reevaluate long-established patterns of both consumption and production.

**Energy Strategies.** After 15 to 20 years of increasing reliance on oil and gas, most East European countries are again emphasizing coal production and are counting on more nuclear power capacity. But with the exception of Poland, which has large hard coal

Table 1

Million b/d Oil Equivalent

USSR: Primary Energy Balance <sup>1</sup>

	1965	1970	1975	1979 <sup>2</sup>
<b>Total Supply</b>	<b>14.14</b>	<b>17.96</b>	<b>23.17</b>	<b>27.32</b>
<b>Production</b>	<b>14.01</b>	<b>17.74</b>	<b>22.67</b>	<b>26.92</b>
Crude Oil <sup>3</sup>	4.84	7.03	9.82	11.71
Natural Gas	2.10	3.27	4.79	6.74
Coal	5.77	6.05	6.60	6.77
Peat, shale, fuelwood	0.81	0.74	0.76	0.65
Hydroelectric power <sup>4</sup>	0.48	0.64	0.60	0.81
Nuclear Power <sup>4</sup>	0.01	0.01	0.10	0.24
<b>Imports</b>	<b>0.13</b>	<b>0.22</b>	<b>0.50</b>	<b>0.40</b>
Crude oil & petroleum products	0.04	0.09	0.15	0.15
Natural Gas	0.00	0.06	0.12	0.12
Coal & coke	0.09	0.07	0.14	0.13
<b>Total Requirements</b>	<b>14.14</b>	<b>17.96</b>	<b>23.17</b>	<b>27.32</b>
<b>Consumption</b>	<b>12.74</b>	<b>15.62</b>	<b>19.82</b>	<b>23.20</b>
Crude oil <sup>3</sup>	3.59	5.22	7.37	8.90
Natural gas	2.09	3.27	4.68	6.06
Coal	5.76	5.74	6.32	6.55
Peat, shale, fuelwood	0.81	0.74	0.76	0.65
Hydro and nuclear power	0.49	0.65	0.69	1.04
<b>Exports</b>	<b>1.40</b>	<b>2.34</b>	<b>3.35</b>	<b>4.12</b>
Crude oil & petroleum products	1.29	1.90	2.60	2.96
Natural gas	0.01	0.06	0.32	0.80
Coal and coke	0.10	0.38	0.42	0.35
Electric power	NEGL	NEGL	0.01	0.01
<b>Net Exports</b>	<b>1.27</b>	<b>2.12</b>	<b>2.85</b>	<b>3.72</b>
Crude oil & petroleum products	1.25	1.81	2.45	2.81
Natural gas	0.01	0.00	0.11	0.68
Coal and coke	0.01	0.31	0.28	0.22
Electric power	NEGL	NEGL	0.01	0.01

<sup>1</sup> Excluding losses and additions to stocks.<sup>2</sup> Preliminary estimate.<sup>3</sup> Including gas condensate.<sup>4</sup> Converted by using factors corresponding to the average amount of fuel required to produce electricity in thermal power plants in the USSR.

Table 2

Million b/d Oil Equivalent

Eastern Europe: Primary Energy Balance <sup>1</sup>

	1965	1970	1975	1978 <sup>1</sup>
<b>Total Supply</b>	<b>5.50</b>	<b>6.75</b>	<b>8.11</b>	<b>9.20</b>
<b>Production</b>	<b>4.57</b>	<b>5.28</b>	<b>5.83</b>	<b>6.32</b>
Crude oil	0.32	0.34	0.36	0.35
Natural gas	0.38	0.64	0.85	1.00
Coal	3.81	4.23	4.49	4.79
Hydro & nuclear <sup>2</sup>	0.06	0.07	0.13	0.13
<b>Imports</b>	<b>0.93</b>	<b>1.47</b>	<b>2.28</b>	<b>2.88</b>
Crude oil & petroleum products	0.49	0.94	1.55	2.00
Natural gas	0.01	0.04	0.19	0.30
Coal & coke	0.40	0.42	0.43	0.44
Electric power	0.03	0.07	0.11	0.14
<b>Total Requirements</b>	<b>5.50</b>	<b>6.75</b>	<b>8.11</b>	<b>9.20</b>
<b>Consumption</b>	<b>4.80</b>	<b>5.94</b>	<b>7.12</b>	<b>8.16</b>
Crude oil	0.59	1.07	1.66	2.06
Natural gas	0.39	0.68	1.03	1.30
Coal	3.75	4.09	4.25	4.55
Hydro & nuclear	0.07	0.10	0.18	0.25
<b>Exports</b>	<b>0.70</b>	<b>0.81</b>	<b>0.99</b>	<b>1.04</b>
Crude oil & petroleum products	0.21	0.21	0.26	0.28
Natural gas	NEGL	NEGL	NEGL	0.01
Coal & coke	0.47	0.56	0.68	0.68
Electric power	0.02	0.04	0.05	0.07
<b>Net Imports</b>	<b>0.23</b>	<b>0.66</b>	<b>1.29</b>	<b>1.84</b>
Crude oil & petroleum products	0.28	0.73	1.29	1.72
Natural gas	0.01	0.04	0.19	0.29
Coal & coke	-0.07	-0.14	-0.25	-0.24
Electric power	0.01	0.03	0.06	0.07

<sup>1</sup> Including Bulgaria, Czechoslovakia, East Germany, Hungary, Poland, and Romania. Excluding losses and additions to stocks.

<sup>2</sup> Detailed data for 1979 not available.

<sup>3</sup> Converted by using factors corresponding to the average amount of fuel required to produce electricity in thermal power plants in Eastern Europe.

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reserves, the long-term prospects are poor for substantial expansion of coal production. The rest of the region must rely on increasingly poorer quality brown coal and lignite. Most of the East European countries have ambitious plans calling for nuclear power to supply from 10 to 25 percent of their energy needs by the turn of the century, but for the next decade, only Bulgaria will have significant nuclear power capacity for its own needs. Romania, the only East European country with gas and oil reserves, is also facing energy problems. Its oil and gas reserves are being depleted, and production for the coming decade will fall.

**Conservation Measures Not Yet a Factor.** Current energy conservation programs in Eastern Europe on the whole have been marked by a reliance upon administrative measures and an unwillingness to clamp down on demand in industry and agriculture. (Only Poland has introduced some industrial conservation measures.) The measures adopted have affected most households and government offices, but these sectors account for only 15 to 25 percent of energy use.

Restructuring national output, that is, changing production and growth priorities to less energy-intensive goods and services, runs counter to traditional Communist growth theory and, even if politically feasible, requires long leadtimes. Aged, obsolescent machinery and equipment burn up an inordinate amount of fuel, but hard currency constraints limit the ability of all East European nations to import advanced, more efficient equipment. Finally, increasing reliance on generally abundant domestic coal and lignite reserves, as other more efficient energy sources become scarcer and more expensive, constrain possibilities for reducing energy use per unit of output.

**Prospects for Imports.** Soviet energy exports to Eastern Europe will expand little, if at all, in the 1980s. Total energy exports are expected to remain at about the 1980 level of 2.3 million b/d oil equivalent, and oil exports at 1.6 million b/d. With Soviet oil deliveries leveling off after 1980, Eastern Europe will be forced to turn increasingly to non-Communist sources. Eastern Europe now imports about 450,000 b/d of non-Soviet crude oil—two-thirds by Romania—mostly from OPEC. Slack Western demand, Western trade restrictions, and uncompetitiveness of East European goods in Western markets hinder Eastern Europe's

ability to earn the hard currency needed to increase oil imports. At the same time, relatively high debt service and tightening conditions in international money markets cloud the prospects for large-scale future borrowing.

In the past, Eastern Europe has relied to a great extent on barter agreements to pay for Middle Eastern oil. The East Europeans, as well as the Soviets, realize that they must intensify their efforts to obtain oil at concessionary prices from the oil-producing less developed countries through arms sales, barter deals, and development assistance. In 1978 this objective was explicitly formulated in the energy program of the Council for Mutual Economic Assistance (CEMA).

However, the prospects for concessionary deals appear increasingly poor. And in 1979, negotiations with Middle Eastern governments, CEMA members got much less oil, even for hard currency, than they hoped to get. At best, CEMA members face great difficulties and uncertainties in obtaining any substantial increase in oil deliveries through government-to-government deals with OPEC countries, while prospects for large purchases from the multinationals are even dimmer.

**Impact of Energy Shortage on Growth.** The East European energy squeeze—combined with slow growth in the working-age population, sluggish productivity, a limited raw material base, and overcentralized and clumsy planning and management—foreshadows a rather dismal economic decade for Eastern Europe. We estimate that balance-of-payments constraints will limit East European purchases of oil to about 450,000 b/d in 1985—about what they now buy for hard currency—which would be valued at about \$4-5 billion—at January 1980 prices. Economic growth, as a consequence, will slow even further in the next six years to perhaps 1 to 2 percent per year compared with an annual average of 4 percent in 1971-79.

#### **Political Aspects**

Soviet leaders and specialists are fully aware that the USSR in the 1980s faces serious energy problems. Available evidence suggests that Soviet production officials think that oil output has just about peaked and will decline if urgent measures (including acquisition of Western technology) are not taken. It is not clear,

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however, how long they think peak production can be held or whether they agree with our forecast. Although the top political leadership may believe that a significant drop in oil production can be avoided during the early 1980s, they probably have been told that such a drop is a distinct possibility.

We doubt, however, that the mounting energy problems of the 1980s have shaken the confidence of the Soviet leadership and bureaucracy in the very long-term energy prospects of the USSR. They are counting on the huge proven coal and natural gas reserves of the country and are hopeful that large new reserves of oil will be discovered.

They are accelerating their nuclear power program, and they express confidence in the future of breeder reactors. This vast potential energy base, they believe, gives the USSR a fundamental strategic advantage in the evolving world balance of power. The "energy problem," as they see it, is essentially a matter of transportation, steeply rising fuel extraction costs, and technological lag—difficulties which they believe can and will be overcome in a decade or two, with or, if necessary without Western assistance.

As oil production falters, Soviet decisions on how to allocate oil among competing uses—domestic consumption, exports to the non-Communist world, and exports to Communist countries—will become increasingly hard and painful. Presumably, the need to avert too sharp a drop in GNP growth domestically and to guard against political instability in Eastern Europe makes exports to the West the most expendable use.

The most difficult and critical choice probably will be between domestic consumption and exports to Eastern Europe. As noted earlier, we expect the USSR to try to maintain energy deliveries to its Warsaw Pact allies at about the 1980 level and to continue to offer much of the energy shipped on at least moderately concessionary terms. To steeply reduce oil exports—and thus total energy exports—would accentuate the anticipated decline in Eastern Europe's economic growth by aggravating energy shortages and/or forcing Eastern Europe to turn to higher cost energy from alternative suppliers.

The slower economic growth in Eastern Europe, the greater the likelihood of political instability there, particularly since the share of output devoted to domestic uses is already on the decline because of the need to reduce balance-of-payments deficits. How to divide output domestically creates a dilemma for East European regimes: the more production devoted to investment, the worse off consumers are in the present; the more production devoted to consumption, the slower future economic growth is likely to be.

The prospect of stagnating living standards in Eastern Europe is doubtless disquieting to Moscow. Deterioration in material well-being in Eastern Europe would increase public resentment toward the Soviet Union and would cause more intense factionalism within East European leadership groups.

It is quite possible that the Soviets have miscalculated (a) their own capacity to supply oil to Eastern Europe in 1981-85, and (b) the East European capacity to acquire oil from OPEC countries, substitute coal for oil, or reduce economic growth and consumption without provoking unrest. The Soviet attitude, however, seems to be that the East Europeans are going to have to pull in their belts just like the Soviet population. While disturbances in Eastern Europe would be highly undesirable, the USSR would not be prepared to pay any price to avoid the use of military force, even against Poland.

Given the possibilities of alarmingly low GNP growth in the USSR and conceivable economic and political disorder in Eastern Europe, the Soviets may consider pursuit of an aggressive policy in the Middle East. Certainly they are aware that access to Iran's oil supply would help alleviate the economic problems facing them and their allies in the mid- and late-1980s.

The Soviets will be seeking means to ensure the flow of energy in the next decade to support their own economy and those of Eastern Europe, and the outlook is not encouraging. The spiraling oil cost will motivate the USSR to seek oil at concessionary prices through arms sales, barter deals, and development assistance as suggested above. Most OPEC countries appear disin-

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terested in this type of arrangement, and the Soviets certainly must hope for a leftist, pro-Soviet government in Iran which would be receptive to this type of arrangement. Certainly their primary objective in Iran is to achieve precisely this type of government.

The Soviets might, in desperation, undertake a unilateral military thrust into Iran, designed primarily to occupy the Khuzestan oilfields. While such an action is not beyond the realm of possibility, it presents the Soviets with enormous difficulties. They must first of all take into account US statements with respect to having a "vital interest" in the Persian Gulf and the West's continued reliance on Iranian oil. They would be aware that they were running a very high risk of direct military confrontation with the United States; they know that Iraq has claims to Khuzestan and would view such action as a major threat to itself; and they would have to weigh the broader and very grave international repercussions of such aggression.

They would also have to recognize the difficulty of permanently occupying Iran and the prospect of having to protect the valuable oilfields against prolonged guerrilla insurgency. It seems unlikely that the Soviets would seize Khuzestan in the near term unless they were "invited" to intervene by a new Iranian regime that enjoyed at least some degree of international recognition.

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